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AUTHOR	Roweton, William E.
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ABSTRACT

The study relates performance on a cognitive-style measure of perceptual sensitivity and grade point averages to several indices of creativity as affected by a checklist procedure and verbal pretraining. Subjects were 76 students, half of which received verbal pretraining requiring them to list adjectives under five categories. The pretrained subjects were divided into three groups. One group was instructed to use the long checklist consisting of seven category names followed by an extensive listing of specific values in thinking of physical changes in the product improvement problem. Another group was instructed to use the short checklist consisting of only seven category labels from the long checklist. The third group did not receive any checklist. The remaining students with no verbal pretraining were also divided into three groups and administered the same checklist treatments as the pretrained subjects. All subjects were presented a product improvement problem for 10 minutes and an unusual uses problem for the following 10 minutes. Among the results are: (1) subjects more sensitive to perceptual detail are not necessarily more creative, (2) grade point averages are not highly related to creativity, (3) verbal pretraining facilitates idea fluency but not originality. (Author/MC)

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Creativity: Idea Quantity and Idea Quality

William E. Roweton

Indiana State University

Earlier studies showed that two simple training techniques, the checklist procedure (e.g., see Davis & Roweton, 1968) and verbal pretraining (Roweton, 1969), facilitate creative idea production in tests requiring Ss to list physical changes for common objects. An idea checklist provides S with a general or specific list of ideas suggesting physical improvements. Verbal pretraining involves controlled, free-association, warm-up prior to problem solving. The Ss list adjectives (that is, different colors, shapes, sizes, etc.) for 5 min. before working on creativity problems (see Roweton, 1969).

The present study related performance on the Hidden Figures Test (HFT), a cognitive-style measure of perceptual sensitivity, and grade point averages (GPA) to several indices of creativity as affected by the checklist procedure and verbal pretraining. One group of college students used a long checklist, an extensive and detailed list of ideas, and a second group used a seven-item short checklist. Half

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of the Ss in these two groups, plus half of the Ss in a control group, were administered verbal pretraining.

Two problems provided dependent measures, a product improvement problem in which Ss listed physical changes for a door knob, and an unusual uses problem, requiring Ss to list uses for a brick.

Based upon earlier studies with the checklist and verbal pretraining procedures, several predictions seemed relatively clear. However, creativity as affected by these operational training procedures has never been empirically related to cognitive style measures or to intellectual-achievement factors (i.e., GPA). First, it was predicted that the short checklist would facilitate creative idea production more than the long checklist or no checklist conditions (e.g., see Davis & Roweton, 1968). Second, verbal pretraining also was expected to facilitate idea production (see Roweton, 1969). Third, concerning cognitive style, it may be assumed that individuals who are perceptually sensitive to detail in the HFT might also be perceptually sensitive to physical dimensions along which common objects may vary. That is, Ss scoring high on the HFT may be more likely to think of physical changes and uses of greater quantity and creative quality. Fourth, since the relationship

among intelligence, academic achievement, and creativity is a contested yet unresolved issue (e.g., see Barron, 1969), the correlations between GPA and creativity scores should provide additional information relevant to this traditionally critical question.

METHOD

Subjects.--A total of 102 students from an introductory educational psychology course at the University of Wisconsin were given the Hidden Figures Test (HFT). Several weeks later, 76 of these Ss volunteered to participate in a creativity experiment.

Procedure.--Half of the 76 Ss received verbal pretraining, requiring them to list adjectives under five categories (i.e., colors, materials, shapes, sizes, and styles). (See Table 1.) For those Ss receiving verbal pretraining, one group was instructed to use the long checklist in thinking of physical changes in the product improvement problem. The long checklist consisted of seven category names followed by an extensive listing of specific values. (See Table 2.) Another group was instructed to use the short checklist consisting of only the seven category labels

from the long checklist. (See Table 3.) A third group did not receive any checklist. Three groups received no verbal pretraining but were administered the same checklist treatments as Ss who received verbal pretraining. That is, one group was administered the long checklist, one group received the short checklist, and one group was not given any checklist.

All 76 Ss were presented the product improvement (door knob) problem for 10 min. and the unusual uses (brick) problem for the following 10 min.

Design.--The relationship between cognitive style, grade point average, and creativity was assessed by Pearson correlation coefficients.

Regarding the training manipulations, a 3 x 2 factorial design was employed, with three levels of checklist training (long, short, or no checklist) and two levels of verbal pretraining (presence or absence).

To evaluate the effects of the checklist procedure and verbal pretraining independently of cognitive style and academic achievement, HFT and GPA were treated as covariates.

Dependent variables.--The dependent measures of creativity were idea frequency, originality, rated practicality, and flexibility.

RESULTS

Physical change (door knob) problem.--An analysis of covariance indicated that the checklist main effect reached significance on the flexibility measure (F=3.83, df=2/68, $p<.03$). On a subsequent Scheffe Multiple F test, long checklist Ss were slightly more flexible than the Short Checklist Group (F=2.61, df=2/70, $p<.10$). Second, on the number of highly practical ideas, the checklist main effect again reached significance (F=3.08, df=2/68, $p<.05$). The Long Checklist Group produced marginally more highly practical physical changes than Ss not receiving any checklist (F=2.76, df=2/70, $p<.10$).

The Ss administered verbal pretraining were significantly less original (F=5.66, df=1/68, $p<.02$), produced a smaller proportion of highly original ideas, but listed slightly more physical changes (F=2.80, df=1/68, $p<.10$) than Ss not receiving pretraining.

Unusual uses (brick) problem.--An analysis of covariance did not yield any significant F ratios for either the checklist or verbal pretraining main effects. However, on the number of uses produced, the checklist X verbal pretraining interaction was significant (F=5.56, df=2/68, $p<.006$). The Ss receiving verbal

pretraining and the long checklist produced significantly more uses than Ss with the long checklist but not receiving pretraining (F=2.15, df=5/70, $p<.05$). Also, on the proportion of highly practical ideas, the checklist X pretraining interaction reached significance (F=4.21, df=2/68, $p<.02$). The Ss with no verbal pretraining and a long checklist produced proportionally more highly practical ideas than Ss receiving both the long checklist and verbal pretraining (F=2.00, df=2/70, $p<.10$).

Selected correlations.--GPA correlated significantly with idea frequency (r=.26, p .02), the number of highly original ideas (r=.27, $p<.02$), and flexibility (r=.22, $p<.06$) in the door knob problem. HFT scores were significantly correlated only with the number of highly practical uses produced in the brick problem (r=.29, $p<.01$).

DISCUSSION

According to the results, first, HFT scores were not substantially related to creativity. The Ss more sensitive to perceptual detail were not necessarily more creative. Second, GPA, like HFT scores, were not highly related to creativity test performance. Obviously, the relationship between quasi-personality measures and

creativity is not direct and simple as initially hypothesized. Creative idea production must be influenced by factors greater than simple perceptual sensitivity and academic achievement. Third, the results clearly indicated that the short checklist did not overwhelmingly enhance creative idea quality as earlier studies suggested (e.g., Davis & Roweton, 1968). Fourth, verbal pretraining facilitated idea fluency, but not originality. That is, verbal warm-up apparently stimulated Ss to produce many common physical changes, inadvertently depressing idea originality. Finally, with the unusual uses problem, neither the checklist nor verbal pretraining main effects clearly influenced idea quantity or quality. Therefore, training for product improvement problems with the checklist and verbal pretraining procedures may not transfer to the unusual uses test.

In summary, the checklist procedure and verbal pretraining enhanced idea fluency more than idea quality (e.g., originality) in the door knob problem. However, it was not substantiated, as assumed by Osborn (1963) and others, that idea quality increases inevitably with idea production. Idea quantity and the number of creative ideas did not substantially correlate in either the door knob problem (r=-.06) or the brick problem (r=-.28).

The effects of simple training procedures must be re-evaluated since the present study questions earlier findings. It may be that idea fluency, the production of many different solutions to a problem, is an important early phase in problem solving. High idea quality may depend upon further elaboration and refinements of the initial ideas.

References

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Davis, G. A., & Roweton, W. E. Using idea checklists with college students: Overcoming resistance. Journal of Psychology, 1968, 70, 221-226.

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TABLE 1

VERBAL PRETRAINING SCORESHEET

Name_____. Sex_____. Date_____.

List as many examples under each of the five categories printed below as you can in 5 min. Two examples of the color category, for instance, could be red and blue. You must list at least four examples for each of the categories.

A. Colors

1. _____
2. _____
3. _____
4. _____
_____
_____
_____
_____
_____
_____

B. Materials

1. _____
2. _____
3. _____
4. _____
_____
_____
_____
_____
_____
_____

C. Shapes

1. _____
2. _____
3. _____
4. _____
_____
_____
_____
_____
_____
_____

D. Sizes

1. _____
2. _____
3. _____
4. _____
_____
_____
_____
_____
_____
_____

E. Designs or Styles

1. _____
2. _____
3. _____
4. _____
_____
_____
_____
_____
_____
_____

TABLE 2

LONG CHECKLIST

AIDS IN THINKING OF PHYSICAL CHANGES

Add and/or Subtract Something

Make Stronger
Make Faster
Exaggerate Something
Duplicate Something
Remove Something
Divide
Make Lighter
Abbreviate
Add New Do-Dad
Add New Smell
New Sound
New Lights
New Flavor
New Beep Beep
New Jingle Jingle
Subtract The Thing That Doesn't Do Anything

Change Shape

Round
Square
Triangle
Oval
Rectangle
5-Sided
6-Sided
8-Sided
10-Sided
Lop-Sided
Sharp Corners
Round Corners
Egg-Shaped
Doughnut-Shaped
"U" Shaped
Other Shapes?

Change Color

Blue
Green
Yellow
Orange
Red
Purple
White
Black
Olive Green
Grey
Brown
Tan
Silver
Gold
Copper
Brass
Plaid
Striped
Polka-dotted
Flowers
Speckles
Paisley
Pop Art
Other Colors?
Color Combinations?
Other Patterns?

Change Size

Longer
Shorter
Wider
Fatter
Thinner
Thicker
Higher
Lower
Larger
Smaller
Jumbo
Miniature
Other Size?

Change the Materials

Plastic
Glass
Fiberglass
Formica
Paper
Wood
Aluminum
Nylon
Cloth
Gunny Sack (Burlap)
Cardboard
Steel
Leather
Copper
Rubber
Other Material?
Combination of These Materials?

Change by Rearranging the Parts

Switch Parts
Change Pattern
Combine Parts
Other Order of Operation
Split Up
Turn Backward
Upside Down
Inside Out
Combine Purposes
Other Switcheroo

Change Design or Style

Oriental design
Swedish design
Mexican design
French design
Eskimo design
Russian design
American design
Indian design
Egyptian design
Spanish design
Old West
Roaring Twenties
Past Century
Next Century
Middle Ages
Cave Man
Pioneer
Hippie
Beatnik
Other Weirdos
Ivy League
Secret Agent
Elves and Fairies
Clown
Football Uniform

TABLE 3

SHORT CHECKLIST

AIDS IN THINKING OF PHYSICAL CHANGES

1. ADD AND/OR SUBTRACT SOMETHING
2. CHANGE COLOR
3. CHANGE THE MATERIALS
4. CHANGE BY REARRANGING THE PARTS
5. CHANGE SHAPE
6. CHANGE SIZE
7. CHANGE DESIGN OR STYLE